

IN THE CLAIMS:

Please amend the claims as set forth below:

1. (Cancelled)

2. (Previously Presented) A storage comprising:

a non-volatile memory storing a first inode locating a first file in said storage and also storing a journal comprising a list of committed inodes; and

a block manager configured to copy said first inode to a second inode, wherein said block manager is configured to change said second inode in response to updates to said first file, and wherein said block manager is configured to atomically update said first file in response to a commit of said first file by writing said second inode to said non-volatile memory, whereby said second inode locates said first file in said storage, and wherein said block manager is configured to record said second inode in said journal.

3. (Original) The storage as recited in claim 2 wherein said commit of said first file comprises a commit command received from an external source which updates said first file.

4. (Original) The storage as recited in claim 3 wherein said commit command comprises a file close command.

5. (Original) The storage as recited in claim 3 wherein said commit command comprises an fsync command.

6. (Original) The storage as recited in claim 2 wherein said journal further includes a checkpoint record including a description of an inode file, a block allocation bitmap, and an inode allocation bitmap.

7. (Original) The storage as recited in claim 6 wherein the description comprises inodes for each of said inode file, said block allocation bitmap, and said inode allocation bitmap.

8. (Previously Presented) An apparatus comprising:

a computing node configured to perform one or more write commands to a file
and a commit command committing the one or more write commands to
said file; and

a storage coupled to receive said one or more write commands and said commit
command, wherein said storage is configured to copy one or more blocks
of said file to a copied one or more blocks, said one or more blocks
updated by said one or more write commands, and wherein said storage is
configured to update said copied one or more blocks with write data
corresponding to said one or more write commands, and wherein said
storage is configured to copy a first inode locating said file in said storage
to a second inode and to update pointers within said second inode pointing
to said one or more blocks to point to said copied one or more blocks, and
wherein said storage is configured to atomically update said file by writing
said second inode responsive to said commit command, and wherein said
first inode is stored in an inode file, and wherein said inode file is
identified by a master inode, and wherein said inode file is atomically
updated with said second inode by writing said master inode subsequent to
said commit command.

9. (Currently Amended) The apparatus as recited in ~~claim 6~~ claim 8 wherein said commit
command comprises a file close command.

10. (Currently Amended) The apparatus as recited in ~~claim 6~~ claim 8 wherein said
commit command comprises an fsync command.

11. (Cancelled)

12. (Previously Presented) A method comprising:

copying a first inode to a second inode, wherein said first inode locates a first file
in a storage;

modifying said second inode in response to one or more changes to said first file;
and

atomically updating said first file by establishing said second inode as the inode
for said first file, wherein said establishing comprises storing said second
inode in a journal stored in a nonvolatile memory.

13. (Original) The method as recited in claim 12 further comprising writing a master
inode corresponding to an inode file including said second inode to a checkpoint record
in said journal.

14. (Original) The method as recited in claim 13 wherein recovering from a system
failure comprises:

scanning said journal to locate a most recent checkpoint record and zero or more
inodes subsequent to said most recent checkpoint record within said
journal;

copying said master inode from said most recent checkpoint record to a volatile
memory; and

updating an inode file corresponding to said master inode with said one or more
inodes subsequent to said most recent checkpoint record.

15. (Original) The method as recited in claim 14 wherein said updating said inode file comprises:

copying one or more blocks of said inode file storing said one or more inodes to a copied one or more blocks; and

updating said master inode in said volatile memory to point to said copied one or more blocks.

16. (Previously Presented) The method as recited in claim 12 wherein said block map further comprises a first inode allocation bitmap indicating which inodes within said first inode file are allocated to files, the method further comprising:

copying said first inode allocation bitmap to a second inode allocation bitmap;

modifying said second inode allocation bitmap to reflect one or more inodes allocated to new files; and

establishing a third inode within said block map to said second inode allocation bitmap subsequent to said modifying said second inode bitmap.

17. (Previously Presented) The method as recited in claim 16 wherein said block map further comprises a first block allocation bitmap indicating which blocks within a storage including said block map are allocated to files, the method further comprising:

copying said first block allocation bitmap to a second block allocation bitmap;

modifying said second block allocation bitmap to reflect one or more blocks allocated to files; and

establishing a fourth inode within said block map to said second block allocation
bitmap subsequent to said modifying said second block allocation bitmap.

18. (Previously Presented) The method as recited in claim 12 wherein said establishing said second inode is performed in response to a commit command.

19. (Original) The method as recited in claim 18 wherein said commit command is a close file command.

20. (Original) The method as recited in claim 18 wherein said commit command is an fsync command.

21. (Cancelled)

22. (Previously Presented) A storage comprising:

a non-volatile memory storing a first inode locating a first version of a file in said storage and also storing a journal comprising a list of committed inodes;
and

a block manager configured to copy said first inode to a second inode, wherein said block manager is configured to change said second inode in response to updates to the file, and wherein said block manager is configured to atomically update the file, producing a second version of the file, in response to a commit of the file by writing said second inode to said non-volatile memory, wherein said second inode locates said second version of said file in said storage, and wherein said block manager is configured to record said second inode in said journal.

23. (Original) The storage as recited in claim 22 wherein said commit of the file comprises a commit command received from an external source which updates the file.

24. (Original) The storage as recited in claim 23 wherein said commit command comprises a file close command.

25. (Original) The storage as recited in claim 23 wherein said commit command comprises an fsync command.

26. (Original) The storage as recited in claim 22 wherein said journal further includes a checkpoint record including a description of an inode file, a block allocation bitmap, and an inode allocation bitmap.

27. (Original) The storage as recited in claim 26 wherein the description comprises inodes for each of said inode file, said block allocation bitmap, and said inode allocation bitmap.

28. (Cancelled)

29. (Previously Presented) A method comprising:

copying a first inode to a second inode, wherein said first inode locates a first version of a file in a storage;

modifying said second inode in response to one or more changes to the file, creating a second version of the file; and

atomically updating the file to the second version by establishing said second inode as the inode for the file, wherein said establishing comprises storing said second inode in a journal stored in a nonvolatile memory.

30. (Original) The method as recited in claim 29 further comprising writing a master inode corresponding to an inode file including said second inode to a checkpoint record

in said journal.

31. (Original) The method as recited in claim 30 wherein recovering from a system failure comprises:

scanning said journal to locate a most recent checkpoint record and zero or more inodes subsequent to said most recent checkpoint record within said journal;

copying said master inode from said most recent checkpoint record to a volatile memory; and

updating an inode file corresponding to said master inode with said one or more inodes subsequent to said most recent checkpoint record.

32. (Original) The method as recited in claim 31 wherein said updating said inode file comprises:

copying one or more blocks of said inode file storing said one or more inodes to a copied one or more blocks; and

updating said master inode in said volatile memory to point to said copied one or more blocks.

33. (Previously Presented) The method as recited in claim 29 wherein said block map further comprises a first inode allocation bitmap indicating which inodes within said first inode file are allocated to files, the method further comprising:

copying said first inode allocation bitmap to a second inode allocation bitmap;

modifying said second inode allocation bitmap to reflect one or more inodes

allocated to new files; and

establishing a third inode within said block map to said second inode allocation
bitmap subsequent to said modifying said second inode bitmap.

34. (Previously Presented) The method as recited in claim 33 wherein said block map further comprises a first block allocation bitmap indicating which blocks within a storage including said block map are allocated to files, the method further comprising:

copying said first block allocation bitmap to a second block allocation bitmap;

modifying said second block allocation bitmap to reflect one or more blocks
allocated to files; and

establishing a fourth inode within said block map to said second block allocation
bitmap subsequent to said modifying said second block allocation bitmap.

35. (Previously Presented) The method as recited in claim 29 wherein said establishing said second inode is performed in response to a commit command.

36-44. (Cancelled)